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ABSTRACTS FROM ASTRONOMICAL PUBLICATIONS.

In accordance with a recent arrangement the members of the scientific staff of the Lick Observatory hold meetings once per week, as an observatory duty, to report upon and discuss the more important articles appearing in the journals of astronomy, the important new books on astronomical subjects, or subjects of current and special interest in the observatory's work. It has been suggested that abstracts of the reports would be of interest to the readers of these Publications, and the Publication Committee has acted favorably upon the suggestion.

It is intended to preserve the qualities of abstracts as far as possible, and to restrict published criticisms, favorable or unfavorable, to a minimum.

THE VARIATION OF α URSÆ MINORIS.

It will be recalled that HERTZSPRUNG announced, in 1911, that α *Ursæ Minoris* (*Polaris*), the star taken as the standard of measurement in the photometric work at the Harvard College Observatory, was itself variable in its light. HERTZSPRUNG'S investigation rests upon photographic magnitudes, and his curve shows a total amplitude of $0^{m}.171$, with a period of 3.9681 days—the period of revolution of *Polaris* as a spectroscopic binary star.

Dr. JOEL STEBBINS has just published[1] the results of his measures of this star with the selenium cell photometer perfected by him. The star β *Ursæ Minoris* was used as a comparison star, and each observation comprised three exposures on β, then six on *Polaris,* and finally three more on β, care being taken to arrange the exposures so that the two stars were observed at practically equal altitudes. As the entire variation in brightness that might be expected in this star was very small, "observations were made only with a first-class sky." From seventeen nights' measures STEBBINS determined a sine curve which gave a total amplitude of $0^{m}.078$, with the same period as HERTZSPRUNG'S. The latter's discovery is therefore fully confirmed, though "the photographic range of variation is 2.2 times the range as determined with selenium." STEBBINS remarks: "This ratio is perhaps about what we should expect, for the *Cepheid* variables[2] usually show a greater photographic variation than visual one, and the difference would be still greater in the case of the two methods at present considered."

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[1] *Astronomische Nachrichten,* **192,** 189, 1912.

[2] *Polaris,* in its spectrum, resembles the *Cepheid* variables, and it was this fact that first led to HERTZSPRUNG'S researches. Since it is now established that it is a variable star, it must hereafter be grouped definitely with the *Cepheid* class.

An addendum to the article reviewed states that KING's photographic work on *Polaris* at Harvard and a rediscussion of the previous visual observations in *Harvard Annals* both show the variation of brightness in this star, the range being about one-tenth magnitude; and concludes: "One thing, however, seems certain,—namely, that in spite of its variability *Polaris* is still a first-class object for a photometric standard, since its changes can be accurately predicted." R. G. AITKEN.

The graduated circles of meridian circles and other astronomical instruments of precision are ordinarily composed of a strip of silver let into a brass wheel; in some modern instruments the wheel or circle is instead of cast iron or steel. From the known difference in the coefficients of expansion of silver and cast iron a difference of 40° C. in a circle one meter in diameter should cause the silver strip to expand about 1.13^{mm} more than the surrounding cast iron, an amount relatively enormous, considering the small quantities to be measured, and the question of how far the accuracy of the divisions is preserved in such construction is one of importance to all engaged in work in the astronomy of precision. Herr F. GÖPEL gives a thoroughgoing investigation of this question in the *Zeitschrift für Instrumentenkunde* for February, 1912. The cast-iron body of the circle was provided with a vessel in which heating or cooling mixtures could be placed, and divisions were engraved, the strokes being partly on the inlaid strip of silver and partly on the cast iron. The total range of temperature tested was 67° C. The probable error of the results was roughly 0.3 of a second of arc, and at least within this limit there was no evidence of relative change between the silver strip and the cast-iron wheel. Doubtless the silver strip is forced by the surrounding metal to accompany it very accurately as it expands or contracts, so that no effect of relative shift is produced.

H. D. C.